

WHAT IS CLAIMED IS:

1. A semiconductor device that is equipped with an operation processing circuit and M number (M is a natural number) of functional blocks having predetermined functions, and that, when connected to an external debug tool, sends data, programs or program instructions in the functional blocks to the debug tool, the semiconductor device comprising:

N number of first circuits that are respectively connected between a predetermined N number (N is a natural number smaller than M) of the functional blocks among the M number of functional blocks and the operation processing circuit, and that, in response to an instruction, transfer data, programs or program instructions between the N number of the functional blocks and the operation processing circuit;

a second circuit that, when connected to the debug tool, controls the operation processing circuit in response to an instruction from the debug tool, and instructs the N number of the first circuits not to transfer data, programs or program instructions between the N number of the functional blocks and the operation processing circuit; and

a third circuit that, upon receiving predetermined data or a signal, instructs the N number of the first circuits according to the predetermined data or signal to transfer data, programs or program instructions between the functional blocks and the operation processing circuit regardless of an instruction from the second circuit,

wherein the operation processing circuit, when not connected to the debug tool, transfers and receives data, programs or program instructions to and from the M number of the functional blocks to execute predetermined operations, and when connected to the debug tool, reads and transfers to the debug tool data, programs or program instructions in the N number of the function blocks through the N number of the first circuits.

2. A semiconductor device according to claim 1, wherein the third circuit receives a plurality of predetermined data or signals, and instructs individual ones of the N number of the first circuits according to the plurality of predetermined data or signals to transfer data, programs or program instructions between the functional blocks and the operation processing circuit, regardless of an instruction from the second circuit.

3. A semiconductor device according to claim 1, wherein the third circuit receives encoded data or signals, decodes the encoded data or signals, and instructs individual ones of the N number of the first circuits according to the decoded data or signals to transfer data, programs or program instructions between the functional blocks and the operation processing circuit, regardless of an instruction from the second circuit.

4. A semiconductor device according to claim 1, wherein the third circuit comprises a register, and when the register is accessed, instructs the N number of the first circuits to transfer data, programs or program instructions between the functional blocks and the operation processing circuit, regardless of an instruction from the second circuit.

5. A semiconductor device according to claim 4, and wherein the third circuit, when predetermined data is written in the register, instructs individual ones of the N number of the first circuits according to the data written in the register to transfer data, programs or program instructions between the functional blocks and the operation processing circuit, regardless of an instruction from the second circuit.

6. A semiconductor device according to claim 4, wherein the third circuit comprises a plurality of registers, and when the registers are accessed, instructs particular ones of the N number of the first circuits according to the registers accessed to transfer data, programs or program instructions between the functional blocks and the operation processing circuit, regardless of an instruction from the second circuit.

7. A semiconductor device according claim 4, wherein the third circuit is comprises a plurality of registers, and when predetermined data is written in any or all of the registers, instructs particular ones of the N number of the first circuits according to the registers accessed and the predetermined data written in the registers to transfer data, programs or program instructions between the functional blocks and the operation processing circuit, regardless of an instruction from the second circuit.
8. A semiconductor device according to claim 1, wherein the predetermined data or signal that is received by the third circuit is supplied from the operation processing circuit or from outside the semiconductor device.
9. A semiconductor device according to claim 4, wherein the register is accessed from the operation processing circuit or from outside the semiconductor device.
10. A semiconductor device according to claim 1, further comprising a fourth circuit that receives data in a predetermined protocol from outside the semiconductor device, and wherein the fourth circuit outputs the predetermined data or signal to the third circuit based on data received from outside the semiconductor device.
11. An in-circuit emulator equipped with a semiconductor device according to claim 1, and a debug tool that is connected to the operation processing circuit and the second circuit within the semiconductor device.